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EUROPEAN PATENT APPLICATION

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Cyclohexadione derivatives, process for preparing the same and selective herbicidal compositions
 as well as herbicidal method.

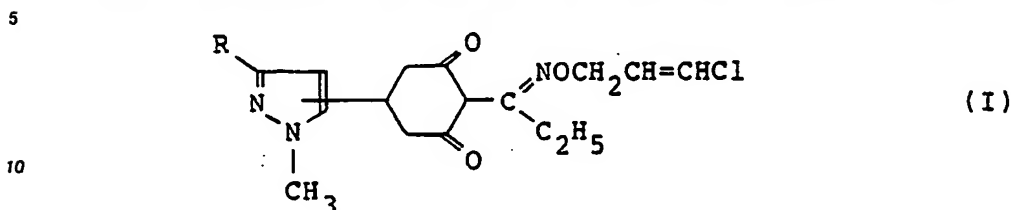
EP 0 292 122 A1

Novel cyclohexane-1, 3-dione derivatives represented by 2-{1-(3-chloro-2-propenyloxyimino)propyl}-5-(1-methyl-1H-pyrazol-4-yl)cyclohexane-1, 3-dione and intermediates thereof are disclosed. The cyclohexane-1,3-dione derivatives have a potent herbicidal effect against a wide variety of weeds and can selectively control injurious weeds at lower dosages. A process for preparing the cyclohexane-1, 3-dione derivatives is also disclosed.

CYCLOHEXADIONE DERIVATIVES, PROCESS FOR PREPARING THE SAME AND SELECTIVE HERBICIDAL COMPOSITIONS AS WELL AS HERBICIDAL METHOD

FIELD OF THE INVENTION AND RELATED ART STATEMENT

The present invention relates to cyclohexane-1,3-dione derivatives represented by general formula (I):



wherein R represents a hydrogen atom or a methyl group and the cyclohexane ring is substituted at the 4- or 5-position of the pyrazole ring, or salts thereof. The cyclohexane-1,3-dione derivatives or salts thereof in accordance with the present invention are novel compounds that are not found in publications. The present invention relates to these compounds or salts thereof, a process for preparing the same and use thereof as well as intermediate compounds for preparing the cyclohexane-1,3-dione derivatives.

It is described in Published Examined Japanese Patent Application KOKOKU No. 57-8099 and Published Unexamined Japanese patent Application KOKAI (Laid-Open) Nos. 57-20035 and 62-4 that cyclohexane-1,3-dione are useful as herbicides. In particular, KOKAI No. 62-4 discloses an invention considered to be similar to the present invention.

SUMMARY OF THE INVENTION

However, the compounds of the present invention are not disclosed in the KOKAI publication supra at all but only some compounds considered to be similar are disclosed therein. In addition, a few compounds are provided with physical properties simply for specifying the disclosed compounds. Further there is found no description showing results that these compounds would be effective.

As a result of extensive investigations to find safe and novel herbicides having an enhanced herbicidal activity and having selectivity between useful plants and injurious weeds, the present inventors have found that the cyclohexane-1,3-dione derivatives or salts thereof represented by general formula (I) are novel compounds which have not been found in publications, exhibit a strong herbicidal activity against a wide variety of harmful weeds that are unexpected from the KOKOKU publication supra and have safe and excellent selectivity of crops such as leguminous plants including soybeans, cottons, beets, sunflowers, etc. The inventors have thus accomplished the present invention.

DETAILED DESCRIPTION OF THE INVENTION

One aspect of the present invention lies in the cyclohexane-1,3-dione derivatives or salts thereof represented by general formula (I) described above.

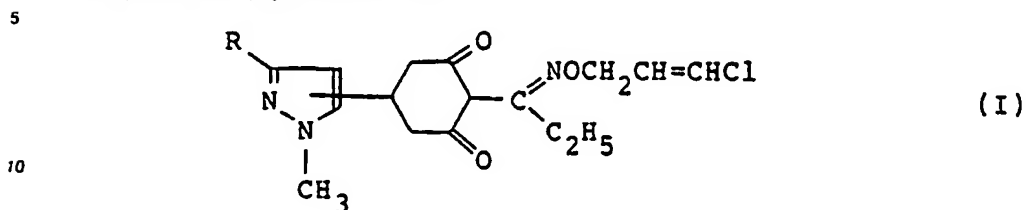
Preferred are those of general formula (I) wherein R is H or CH₃.

As more preferred ones, mention may be made of the following specific compounds:

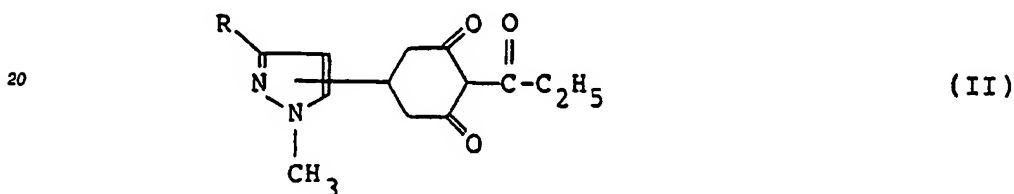
- 2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1-methyl-1H-pyrazol-4-yl)cyclohexane-1,3-dione,
 2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1-methyl-1H-pyrazol-5-yl)cyclohexane-1,3-dione,
 (E)-2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1-methyl-1H-pyrazol-4-yl)cyclohexane-1,3-dione,
 (E)-2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1-methyl-1H-pyrazol-5-yl)cyclohexane-1,3-dione,
 2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1,3-dimethyl-1H-pyrazol-4-yl)cyclohexane-1,3-dione,
 2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1,3-dimethyl-1H-pyrazol-5-yl)cyclohexane-1,3-dione,
 (E)-2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1,3-dimethyl-1H-pyrazol-4-yl)cyclohexane-1,3-dione, and,

(E)-2-{1-(3-Chloro-2-propenyloxyimino)propyl}-5-(1,3-dimethyl-1H-pyrazol-5-yl)cyclohexane-1,3-dione.

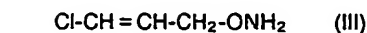
Another aspect of the present invention lies in a process for preparing cyclohexane-1,3-dione derivatives represented by general formula (I):



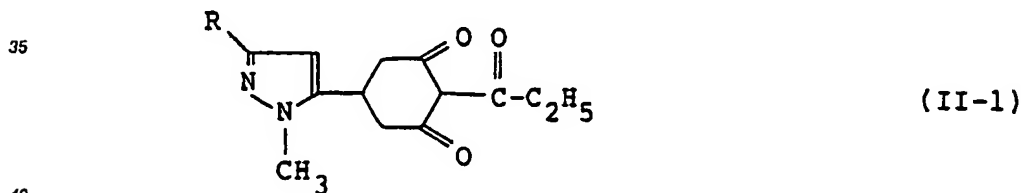
wherein R represents a hydrogen atom or a methyl group and the cyclohexane ring is substituted at the 4- or 5-position of the pyrazole ring, or salts thereof which comprises reacting compounds represented by general formula (II):



wherein R has the same significance as described above, with a compound represented by general formula (III):



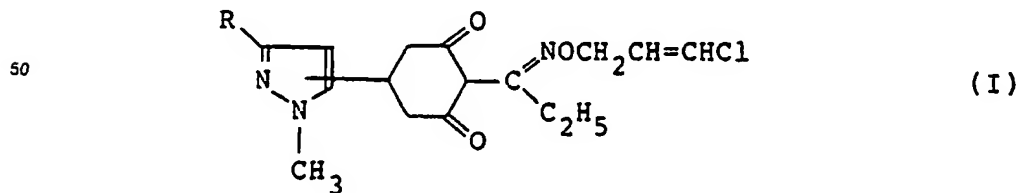
A third aspect of the present invention lies in intermediate compounds for preparing the cyclohexane-1,3-dione derivatives or salts thereof, which are represented by general formula (II-1):



wherein R represents a hydrogen atom or a methyl group.

Of these, 5-(1-methyl-1H-pyrazol-5-yl)-2-propionylcyclohexane-1,3-dione and 5-(1,3-dimethyl-1H-pyrazol-5-yl)-2-propionylcyclohexane-1,3-dione are particularly useful as the intermediates.

A fourth aspect of the present invention resides in selective herbicidal compositions comprising cyclohexane-1,3-dione derivatives represented by general formula (I):



wherein R represents a hydrogen atom or a methyl group and the cyclohexane ring is substituted at the 4- or 5-position of the pyrazole ring, or salts thereof in a herbicidally effective dose and inert carriers. The